

**Abstract**

The present invention relates to a dispersion compensating optical fiber ("DC fiber") having a segmented core of at least three segments and having a negative total dispersion and negative dispersion slope in the L-band. The index profile of the segmented core is selected to provide an optical fiber having properties suitable for a high performance communication system operating in the L-band wavelength band, i.e., between about 1570 nm to 1620 nm. The DC fiber according to the invention exhibits total dispersion at 1595 nm of between -95 and -225 ps/km/nm and dispersion slope more negative than -1.0 ps/km/nm<sup>2</sup>. The DC fiber may be optically connected to a non-zero dispersion shifted fiber in the system to compensate for dispersion and dispersion slope thereof.

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